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September 30, 1994

Mr. Bruce Franca  
Deputy Chief  
Office of Engineering and Technology  
Federal Communications Commission  
2025 M Street, N.W., Room 7002  
Washington, D.C. 20554

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SEP 30 1994

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

Re: PR Docket No. 93-61  
Automatic Vehicle Monitoring (AVM)

Dear Mr. Franca:

On September 26, 1994, Richard E. Wiley of this firm, Louis Jandrell and James Pautler of Pinpoint Communications, Inc., ("Pinpoint") and I met with you and representatives of Metricom, Itron, and TIA to discuss Part 15 and wide-area AVM compatibility issues. At that meeting, we reiterated Pinpoint's willingness to participate in tests with members of the Part 15 "community" in order to obtain a better understanding of issues concerning potential interference in the 902-928 MHz band.

In order to further that dialogue, we provide herein a set of principles that Pinpoint believes should guide any such testing and the reporting of results to the FCC. Tests designed and conducted pursuant to these principles will provide valuable information to the Commission as it considers what step to take next in Docket 93-61. Pinpoint is confident that such information will also assist users of the 902-928 MHz band, as well as the designers and manufacturers of equipment and systems that are used in this band, in efforts to reduce the potential for interference.

Pinpoint believes that tests should cover two principle areas of inquiry. First, the tests should examine the potential for actual harmful interference of the various types of Part 15 systems to wide-area AVM systems. Pinpoint believes that such testing should endeavor to identify those types of Part 15 systems that have a real potential to degrade the performance of wide-area systems and those that do not. The impact of Part 15 systems on both the mobile-to-base and the base-to-mobile (*i.e.*, forward link) functions needs to be examined as both functions are absolutely critical to vehicle location.

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Second, Pinpoint is aware that some Part 15 users and manufacturers have expressed concern about the potential for the forward links of multilateration systems to cause interference to unlicensed systems. Although Part 15 systems are required to accept any interference received from licensed operations, this potential could also be explored. The susceptibility to interference of a variety of devices, voice/audio devices (e.g., cordless telephones), video devices (e.g., wireless VCR hook-ups), and data devices (e.g., automatic meter readers and wireless local area networks) should all be examined. In any event, however, Pinpoint firmly believes that the interference threat of high-power Part 15 systems to other unlicensed systems in this band should also be tested. As Pinpoint has explained in its recent *ex partes*, some Part 15 operations appear to pose a far more significant interference threat in the 902-928 MHz band than do the forward links of AVM systems.

Moreover, Pinpoint wishes to express its willingness to test with local-area AVM systems, just as it has already done with AMTECH Corporation. The results of the testing with AMTECH make Pinpoint confident that wide-area systems can share spectrum on a co-primary basis with local-area AVM systems. Accordingly, Pinpoint submits FCC involvement in testing at this point in time should be directed to the much more controversial issues of Part 15 and wide-area AVM compatibility. Nevertheless, local-area proponents that wish to engage in compatibility testing with Pinpoint's ARRAY™ system need only contact Pinpoint to arrange such a test.

Pinpoint believes that all of the testing should proceed from a consistent set of principles in order to ensure that a conceptually consistent approach is followed and that the Commission receives a coherent body of interference-potential-related information. Specifically, Pinpoint submits that the following principles should guide Part 15 and wide-area AVM testing:

- Interference to a certain degree in the 902-928 MHz band is inevitable given the large hierarchy of users in the band. Systems should be designed to tolerate reasonable levels of interfering signals. The testing thus should seek to understand when *actual interference that cannot be tolerated* occurs. In other words, the occurrence of interference cannot be measured on the assumption that the interference tolerance of the equipment and systems is "zero."
- The tests must recreate and evaluate, to the extent possible, actual *system* operations.

- Unit-to-unit analysis should be secondary to system analysis. For example, measuring the strength of the signal from a cordless telephone handset that is received by a wide-area AVM base station should be considered far inferior to assessing the impact, if any, of cordless telephones on the ability of a wide-area AVM *system* to accurately and reliably locate vehicles.
- The baseline performance of a system should be assessed at the test site rather than on the manufacturer's specifications. For example, the range of a cordless telephone should be determined at the test site. The effects of a wide-area AVM base station or a Part 15 data distribution network, for example, on the telephone's range should be compared to that baseline. In other words, the "paper" specifications of equipment should not provide the baseline against which interference effects on performance are measured because real world conditions will affect the performance of any system regardless of the presence of a potentially interfering system.
- The potential for interference should not be estimated by projections or the analysis of equipment or systems outside a real or realistic operational environment.
- The test should be designed so that all potential sources of interference external to the actual test participants have been accounted for. If necessary, this may require the tests to be run at different times of day or on successive days.
- The tests should not be conducted in order to "critique" system or equipment designs nor involve a comparison of systems or devices. Provided that the equipment, devices, or systems involved comply with the Commission's current rules, the systems and devices should merely be evaluated for their potential to cause and their ability to tolerate interference from other users of the band. The issue is not "is this design better than that one?" but is there really an interference problem in this band? If the tests show that there is, the next question is, what is the degree and scope of that problem?

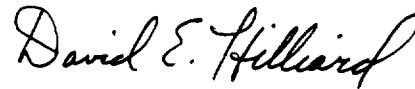
- The tests should be conducted, when possible, with at least one FCC engineer present. Where this is not feasible, the FCC should be informed in advance of the agreed upon test procedures. This step will give the FCC an opportunity to suggest modifications to the test procedures if the agency believes such changes will enhance the value of the test results to the FCC rulemaking process.
- Where possible, tests should be conducted between systems on a one-to-one basis in order to isolate sources of interference. Under certain conditions, the interference tolerance of a system may be tested in the presence of multiple signals, *e.g.*, to see if a Part 15 system or an AVM system has any susceptibility to combined noise levels. In such cases, more than one "interfering" system may be in operation simultaneously.
- Test results that are quantitative should be favored over those that are qualitative or anecdotal, but the requisite baseline must have been established. Ideally, the tests will provide statistically significant results. Pinpoint recognizes that some test results may of necessity be qualitative or subjective, but such information must be compared against the baseline description of the actual performance of the "victim" system at the test-site in the absence of interference from test participants, as explained above.
- If the test results yields inconclusive results, the participant engineers should confer to determine whether the results are the product of poor test conditions, a poor test design, or poor data. The engineers should work in good faith to make the necessary adjustments, if any, and to run the test again.
- Tests must be designed to be completed on a timely basis while employing or simulating real-world operations. The tests should employ existing facilities and equipment. Where "installation" is required, the tests should be designed to minimize unnecessary expense to participants.
- Test participants will agree to work in good faith to prepare joint reports of the test results and submit them to the FCC. However, all participants may prepare and submit their own reports as they deem appropriate.

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Pinpoint submits that tests designed and conducted by the participants pursuant to these guidelines will lead to results useful to the Commission in resolving the interference issues that have persisted in this docket. Pinpoint would be pleased to meet again with you and/or members of the wide-area AVM and Part 15 "communities" to discuss these principles in more detail.

Should you have any questions, please do not hesitate to contact the undersigned.

Respectfully,

A handwritten signature in cursive script, reading "David E. Hilliard".

David E. Hilliard  
Counsel for Pinpoint  
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cc: Attached List

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